

2. A better understanding of vegetation changes that have occurred in the past, those now in progress, or those to be expected to occur in the future.

3. Further contributions to our knowledge of the value of certain plants and vegetational types as indicators of particular soil and climatic conditions. These should have an important application in many fields, both in pure research and in applied fields such as game and land management.

4. Suggestions for future investigations and also a foundation for further research.

The projected study is in too preliminary a stage for present discussion other than to mention briefly two first steps which, in addition to the field work, are already under way. One of these is the preparation of maps of the Southern California region on a scale of one-quarter inch to one mile, each showing the distribution of one of the forty-two more important trees and shrubs. Both the dominant and scattered occurrence of the species are indicated on these maps, which are on tracing linen and will be superimposed on maps showing geologic formations, the various climatic factors and fire history. Thus, by these and other means, such as a statistical analysis of the sample plots, it is hoped to determine the rôle of the various factors controlling the distribution of these species. The other step is a systematic search of the literature for references to the character of the vegetation found by the early Spanish explorers and other pioneers in California, also to sawmill and logging operations, fires, and other destructive activities of man. Considerable progress has already been made in this compilation and from the information thus obtained it should be possible, in conjunction with evidence procured in the field work, as illustrated by the El Dorado County survey, to reconstruct a partial picture of former vegetation for comparison with that existing today.

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January 31, 1935.

RICHARD MORRIS HOLMAN

Richard Morris Holman was born in Allegheny, Pennsylvania, January 9, 1886, and died in Berkeley, California, April 23, 1935. His father and mother were both members of old New England families. His father, who was an attorney, died when the boy was quite young and the family moved to Palo Alto, California, where his secondary school education was completed. He entered Stanford University in 1903 and was graduated with the degree of Bachelor of Arts in 1907. It was during his college course that he became definitely committed to the study of botany as his life work. He served as assistant in the department at Stanford University and remained as acting instructor for one year. He was married to Esther Grace Hopkins in 1909,

and went to the Philippine Islands, where he served as instructor in botany in the Agricultural College of the University of the Philippines from 1909 to 1912. He spent two years, 1912-1914, as a student at the Botanisches Institut, University of Leipzig, in the laboratories of Professor Pfeffer, where he carried on studies in his chosen field of plant physiology. He then returned to California, serving as teaching fellow in the Department of Botany, University of California, 1914-15, where he received the degree of Doctor of Philosophy in 1915.

He served as instructor in botany at the University of Michigan 1915-17, going then to the post of professor of botany at Wabash College where he served during 1917-20. During this period he was also an active member of the State Conservation Commission. He returned to the University of California in the fall of 1920 and served as assistant professor 1920-1926, and as associate professor 1926-1935.

He was the author of a number of scientific papers, and very well known as co-author with W. W. Robbins of the widely used Textbook of General Botany, and Elements of Botany, which first appeared in 1924 and 1928, respectively.

He was a prominent member of several scientific and honor societies and was active also in church and charity organizations.

An outstanding characteristic of Dr. Holman was his love of teaching and his interest in the students who attended his classes. With a large number of these he was personally acquainted. He is mourned by his wide circle of friends and by his mother, his wife, and two daughters who survive him.—LEE BONAR.

REVIEWS

Recherches sur l'Ascension de la Sève. By L. HAUMAN, Professeur a l'Université de Bruxelles. Académie royale de Belgique. Classe des Sciences. Mémoires. Coll. in 8°. Tome XII, Fasc. 7. 1934.

The author of this paper begins, as we well may, with the rhetorical and factual question—"Two centuries after the publication of Hales' 'Vegetable Statics' (1727), forty years after the publication of Strasburger's great work [Die Leitungsbahnen in den Pflanzen, 1891], and more than twenty years since Dixon first set forth his cohesion theory (1909), has the problem of the ascent of sap finally been solved?"

Of the many theories which have been advanced a very few survive, not because they are convincing, but merely because they are less faulty than others. According to some persons living cells carry the water (sap) from roots to leaves, according to others only physical forces are concerned, while still others contend that the maintenance of that physical system in which movement of water takes place is accomplished only